



Computer Aided Design (CAD) and Rapid Prototyping

Overview:

The Natick Soldier Center has the capability to create three-dimensional (3D) solid Computer Aided Design (CAD) models, conduct engineering studies utilizing Finite Element Analysis (FEA), and produce 3D prototypes directly from Computer Aided Design (CAD) data. This is a useful tool for evaluating component/system design issues prior to actual fabrication. In some cases, the prototype can be used directly for manufacturing actual parts. The system allows for the fast, efficient, and cost effective development of systems and their components while conducting "What-If" studies for optimization.

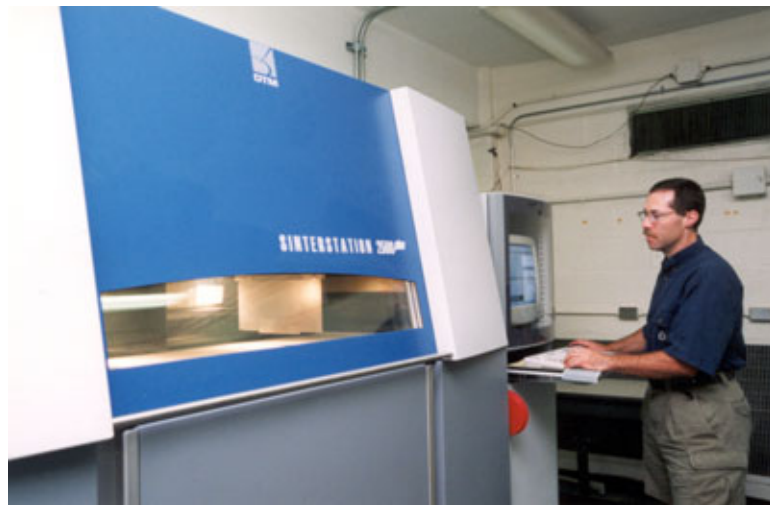
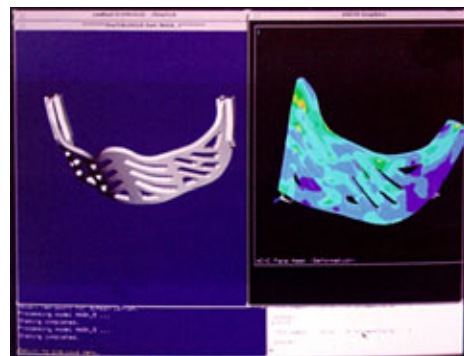
Description:

Pro/Engineer® CAD software and ANSYS® FEA software are used to design and analyze system components and assemblies in virtual space allowing for rapid development and "What-If" studies. The CAD data is then transferred to the Helisys® Laminated Object Manufacturing® (LOM™) system which is used to generate 3D prototypes from the existing CAD data by laminating layers of a special paper and laser cutting the part boundary.

The end result is a part which can be used by designers and engineers for visual inspection, compatibility studies, and analyzing requirements. The LOM parts can also be used as masters for manufacturing components using low pressure casting, investment casting, vacuum forming, sand casting, or direct injection molding of the coated LOM part.

Three dimensional parts can be built directly from computer aided design data with an

accuracy of $\pm 0.005"$. Parts can be as large as 32" L \times 22" W \times 20" H. They can also be built as separate pieces and rejoined to achieve larger parts. The object can be sanded, finished or painted as desired. Some additional manufacturing processes can also be performed. LOM parts can also be used as masters to fabricate prototypes suitable for field evaluations to assess form, fit, and some function issues.



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